

The Rich Mathematician

One day during the spring, a rich man, but a very eccentric man who happens to be a very accomplished mathematician, approaches you with the following problem. He says that as a reward for excelling in your math class, he would like to give you a sum of money, but you need to determine how you want to receive it. He says that he will pay you this money by either one of two plans, PLAN A or PLAN B. The descriptions of the plans are:

PLAN A: He will begin on June 1st and pay you \$500, and he will pay you \$500 for every successive day in the month of June. In other words, he will give you another \$500 on June 2nd, \$500 on June 3rd, etc. He will continue to give you this amount for every day through June 30th.

PLAN B: He will begin on June 1st and pay you \$0.01, and he will double the amount every day. In other words, he will give you \$0.02 on June 2nd, \$0.04 on June 3rd, \$0.08 on June 4th, etc. Again, he will continue to double the amount every day through June 30th.

Being the astute student that you are, although PLAN A sounds fantastic, you have a feeling that there is a trick to the problem, and you feel that PLAN B might actually be better in the long run. So you tell the mathematician that you want to select PLAN B. Of course, he is very proud of you because of your decision. However, he increases the amount in PLAN A to \$1000 on the first day, and \$1000 for every successive day in the month through June 30th. What do you do now?

You ask him if you can have some time to analyze the two plans, so that you can make an “analytical decision”. Now he is very proud of you and so he replies with the following problem:

He will give you \$1,000,000 bonus if you can tell him how much money you would need to receive every day if you decided to choose PLAN A, in order for the sum after the 30 days would exceed the amount you would be receiving if you chose PLAN B.

You have some work to do!